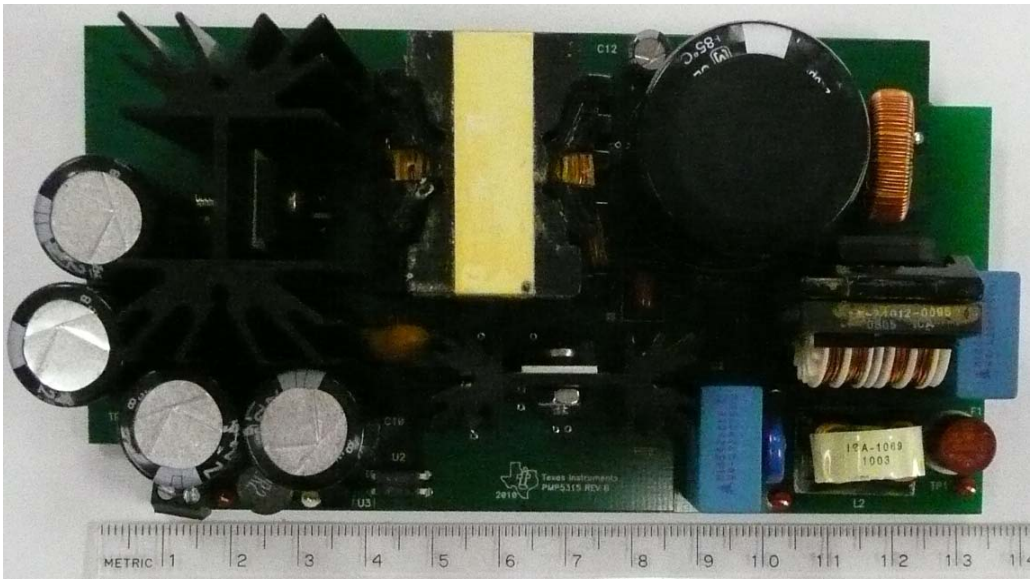
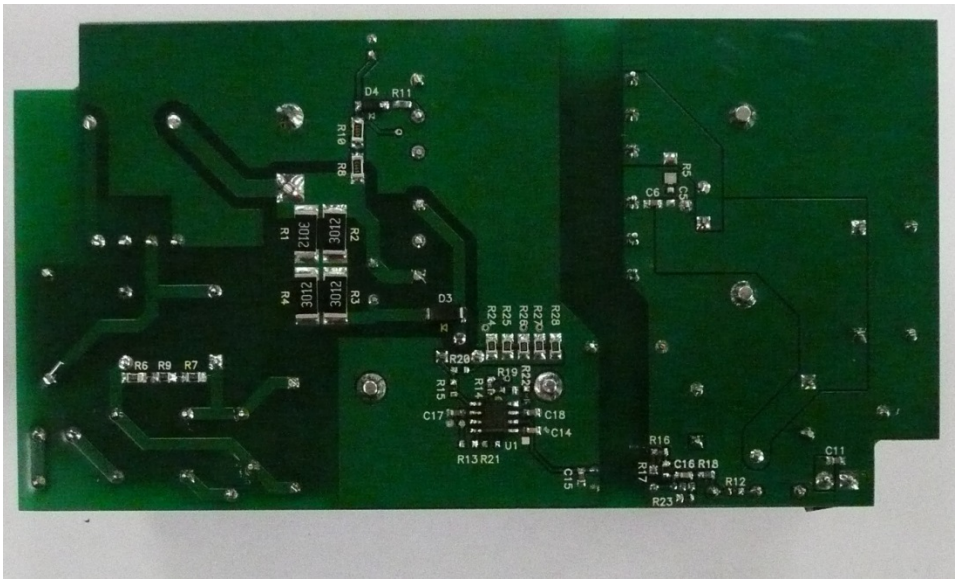
1 Photo

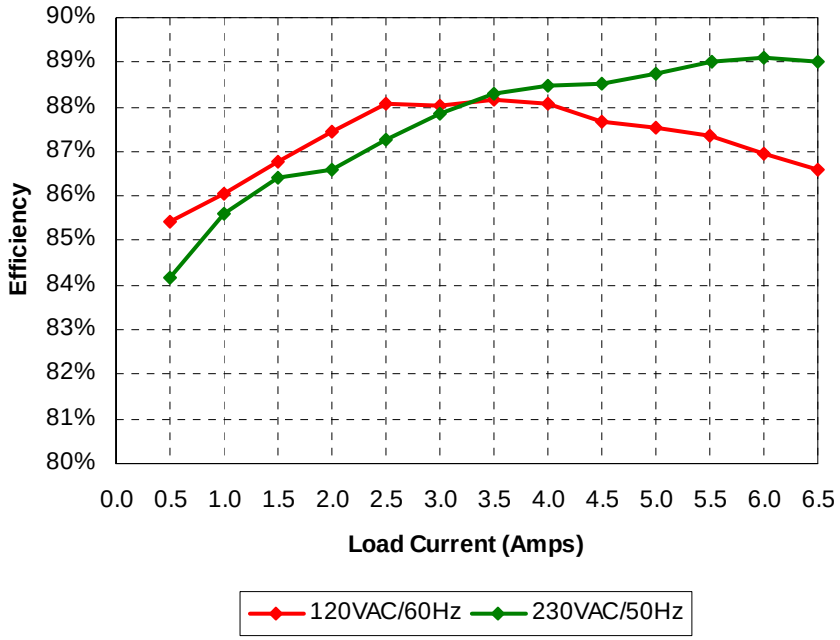
The photographs below show the top and bottom views of the PMP8970 Rev A demo board. This circuit was built using a PMP5315 Rev B PCB.





2 Efficiency

The efficiency data is shown in the tables and graph below.



120VAC/60Hz

Iout	Vout	Vin	Iin	Pin	PF	Pout	Losses	Efficiency
0.501	14.20	119.8	0.142	8.33	0.49	7.11	1.22	85.4%
1.001	14.20	119.6	0.258	16.52	0.54	14.21	2.31	86.0%
1.501	14.20	119.4	0.367	24.56	0.56	21.31	3.25	86.8%
2.003	14.20	119.2	0.472	32.53	0.58	28.44	4.09	87.4%
2.499	14.20	119.1	0.572	40.3	0.52	35.5	4.8	88.1%
3.005	14.20	119.0	0.676	48.5	0.60	42.7	5.8	88.0%
3.501	14.20	118.8	0.776	56.4	0.61	49.7	6.7	88.1%
4.006	14.20	118.7	0.878	64.6	0.62	56.9	7.7	88.1%
4.50	14.20	118.4	0.978	72.9	0.63	63.9	9.0	87.7%
5.00	14.20	118.1	1.077	81.1	0.64	71.0	10.1	87.5%
5.50	14.20	118.0	1.179	89.4	0.64	78.1	11.3	87.4%
6.00	14.20	117.8	1.282	98.0	0.65	85.2	12.8	86.9%
6.50	14.20	117.6	1.384	106.6	0.66	92.3	14.3	86.6%

230VAC/50Hz

Iout	Vout	Vin	Iin	Pin	PF	Pout	Losses	Efficiency
0.501	14.21	230.6	0.093	8.46	0.39	7.12	1.34	84.2%
1.000	14.21	230.5	0.163	16.60	0.44	14.21	2.39	85.6%
1.501	14.20	230.4	0.229	24.66	0.47	21.31	3.35	86.4%
2.001	14.20	230.3	0.295	32.82	0.48	28.41	4.41	86.6%
2.501	14.20	230.2	0.355	40.7	0.50	35.5	5.2	87.3%
3.000	14.20	230.1	0.415	48.5	0.51	42.6	5.9	87.8%
3.501	14.20	230.0	0.474	56.3	0.52	49.7	6.6	88.3%
4.000	14.20	229.9	0.531	64.2	0.53	56.8	7.4	88.5%
4.50	14.20	229.8	0.589	72.2	0.53	63.9	8.3	88.5%
5.00	14.20	229.6	0.646	80.0	0.54	71.0	9.0	88.8%
5.51	14.20	229.5	0.704	87.9	0.54	78.2	9.7	89.0%
6.00	14.20	229.4	0.759	95.6	0.65	85.2	10.4	89.1%
6.50	14.20	229.3	0.817	103.7	0.55	92.3	11.4	89.0%

3 Light Load Power Consumption

The tables below show the input power and efficiency during light load operation.

120VAC/60Hz

Iout	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
0.000	14.21	119.8	18.0	0.09	0.03	0.00	0.09	0.0%
0.050	14.20	119.7	26.5	0.91	0.29	0.71	0.20	78.0%
0.102	14.20	119.7	40.0	1.78	0.37	1.45	0.33	81.4%
0.150	14.20	119.7	52.9	2.58	0.41	2.13	0.45	82.6%
0.199	14.20	119.6	66.1	3.43	0.43	2.83	0.60	82.4%
0.249	14.20	119.6	78.9	4.25	0.45	3.54	0.71	83.2%

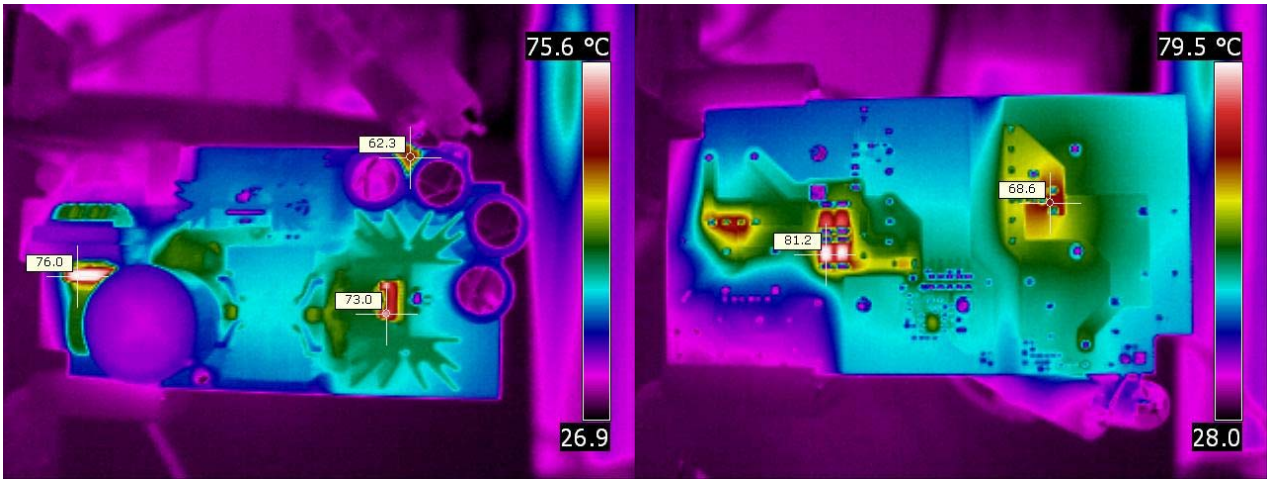
230VAC/50Hz

Iout	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
0.000	14.21	230.7	28.9	0.25	0.04	0.00	0.25	0.0%
0.050	14.21	230.7	31.7	1.07	0.15	0.71	0.36	66.4%
0.100	14.21	230.7	36.8	1.90	0.22	1.42	0.48	74.8%
0.150	14.21	230.7	43.0	2.73	0.28	2.13	0.60	78.1%
0.200	14.21	230.7	49.8	3.54	0.31	2.84	0.70	80.3%
0.249	14.20	230.6	56.7	4.35	0.33	3.54	0.81	81.3%

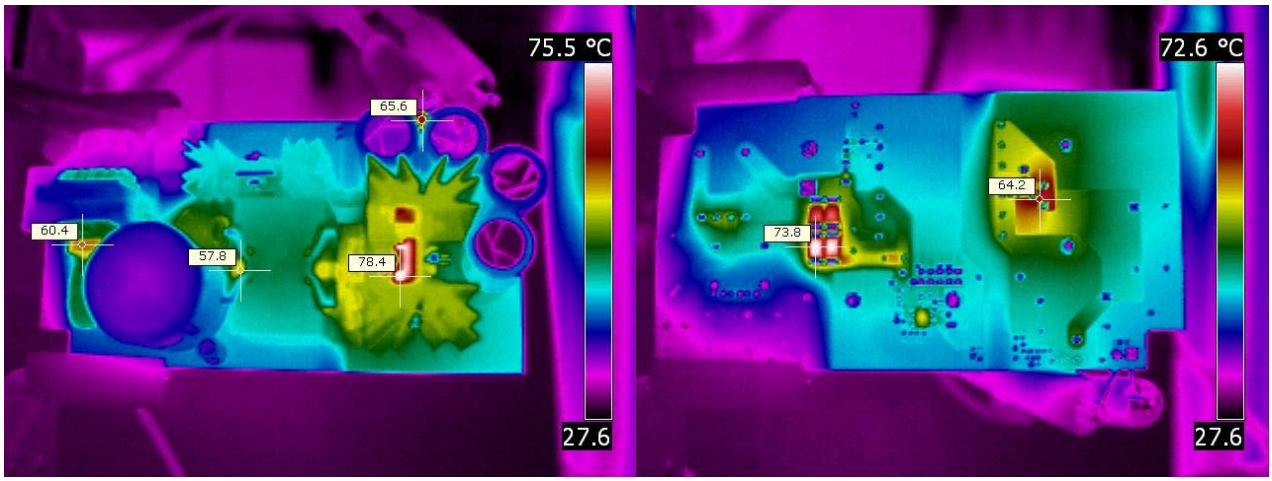
4 Thermal Images

The thermal images below show a top view (left) and bottom view (right) of the board. The ambient temperature was 26ºC with no forced air flow. The output was loaded with 6.5A.

4.1 120VAC, 60Hz Input

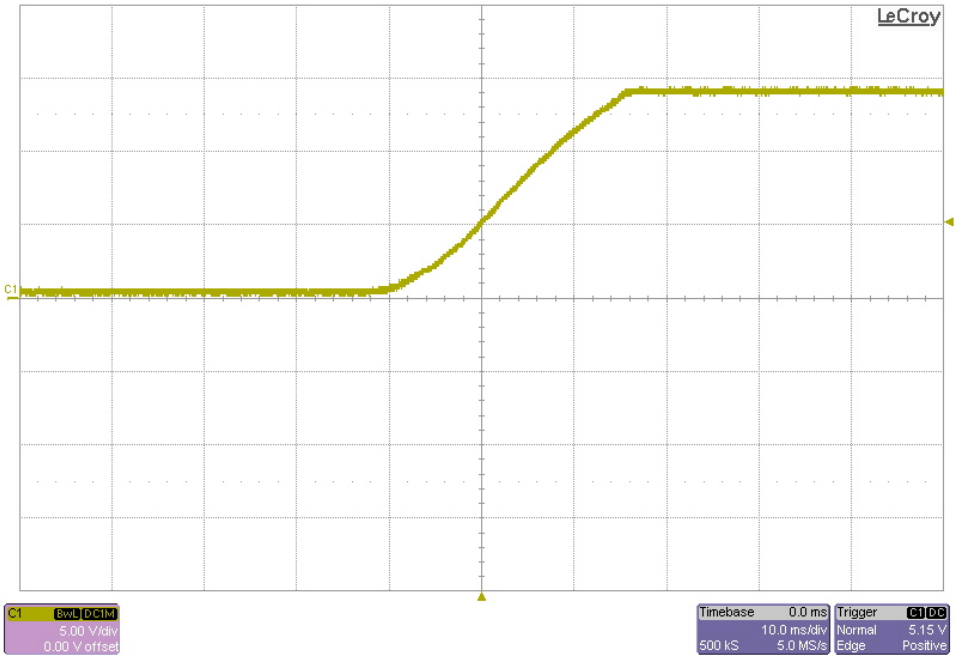


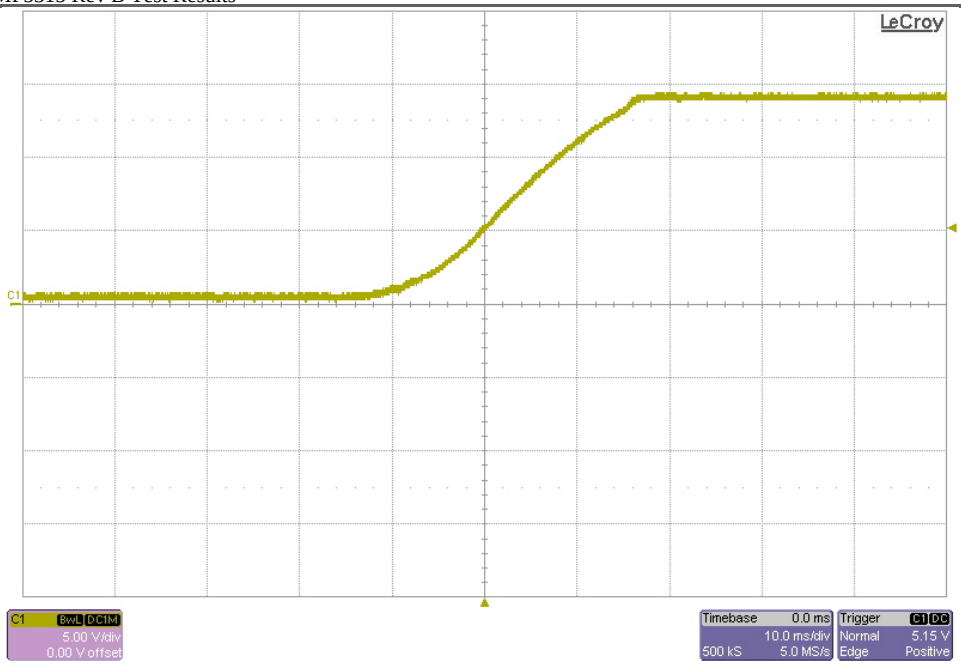
4.2 230VAC, 50Hz Input



5 Startup – No Load

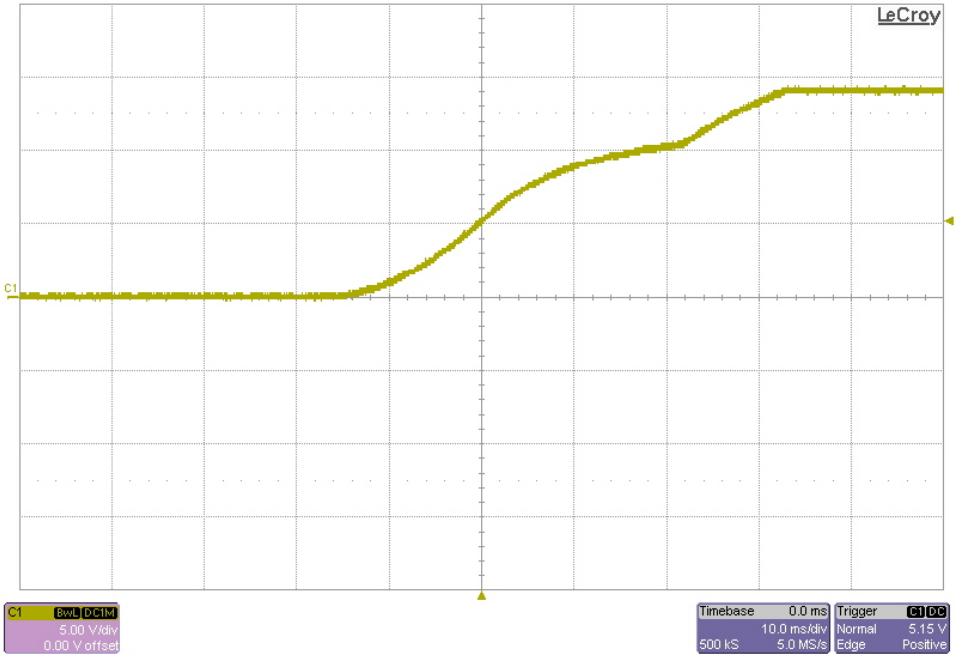
The output voltage at startup is shown in the images below. The output was unloaded. For the top image, the input was 150VDC. For the bottom image, the input was 300VDC.

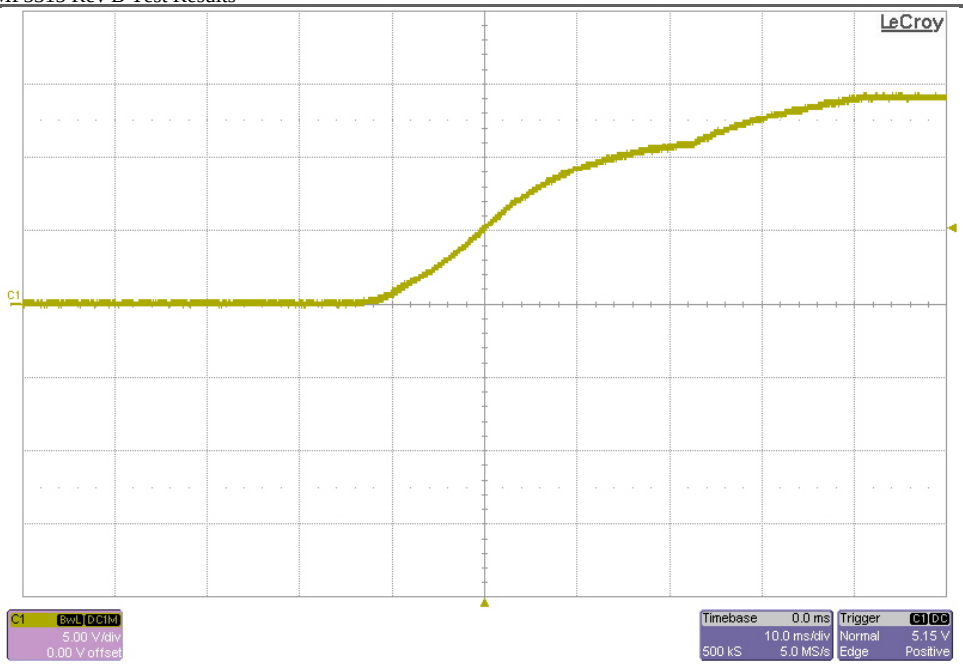




6 Startup – Full Load

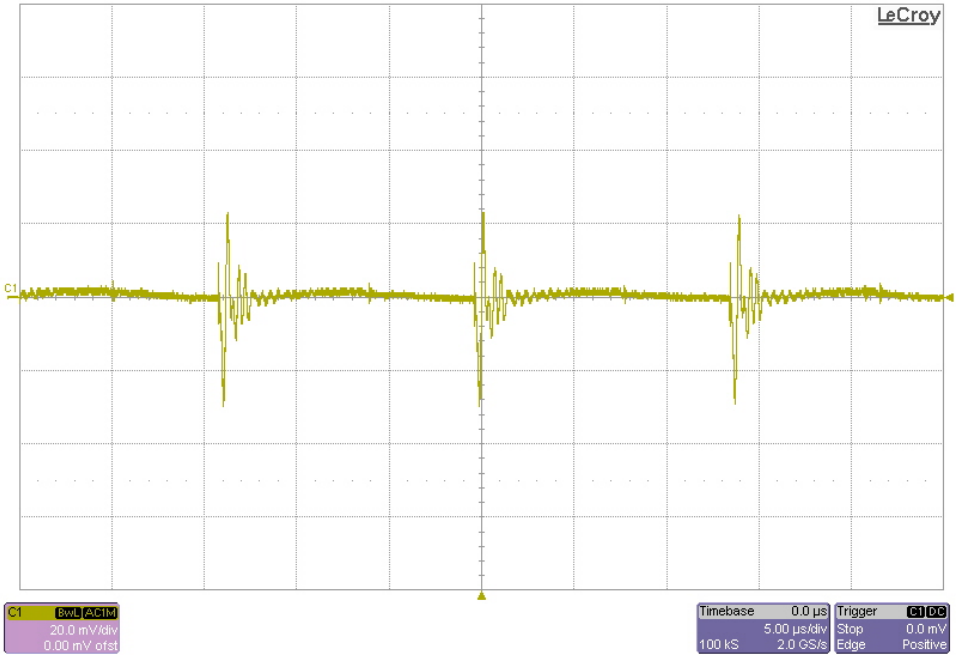
The output voltage at startup is shown in the images below. The output was loaded with 6.5A. For the top image, the input was 150VDC. For the bottom image, the input was 300VDC.

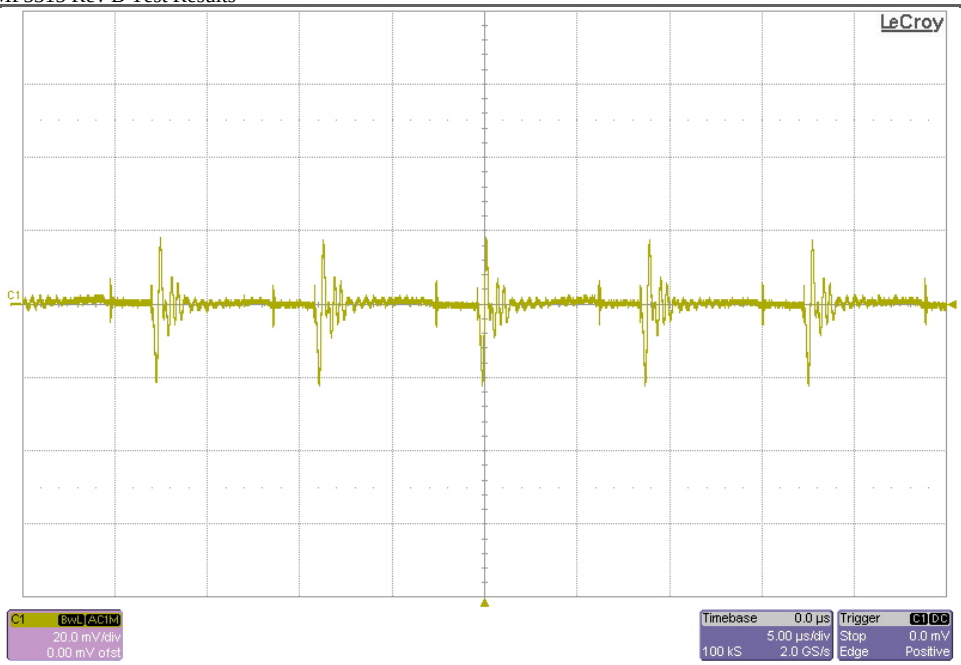




7 Output Ripple Voltage – Full Load

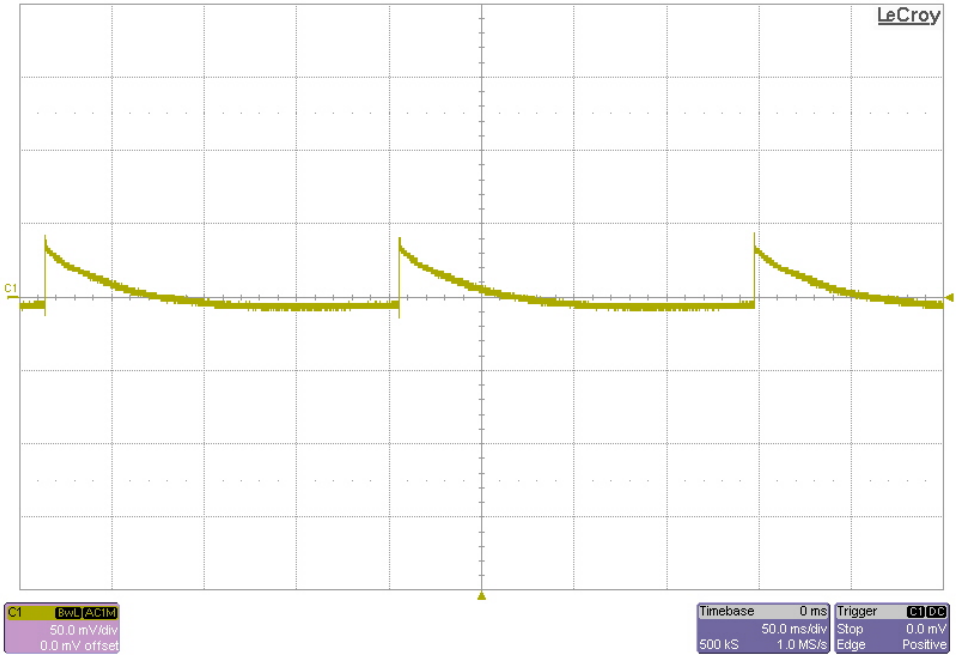
The output ripple voltage during full load (6.5A) operation is shown in the plots below. The top image shows the ripple with a 150VDC input. The bottom image shows the ripple with a 300VDC.

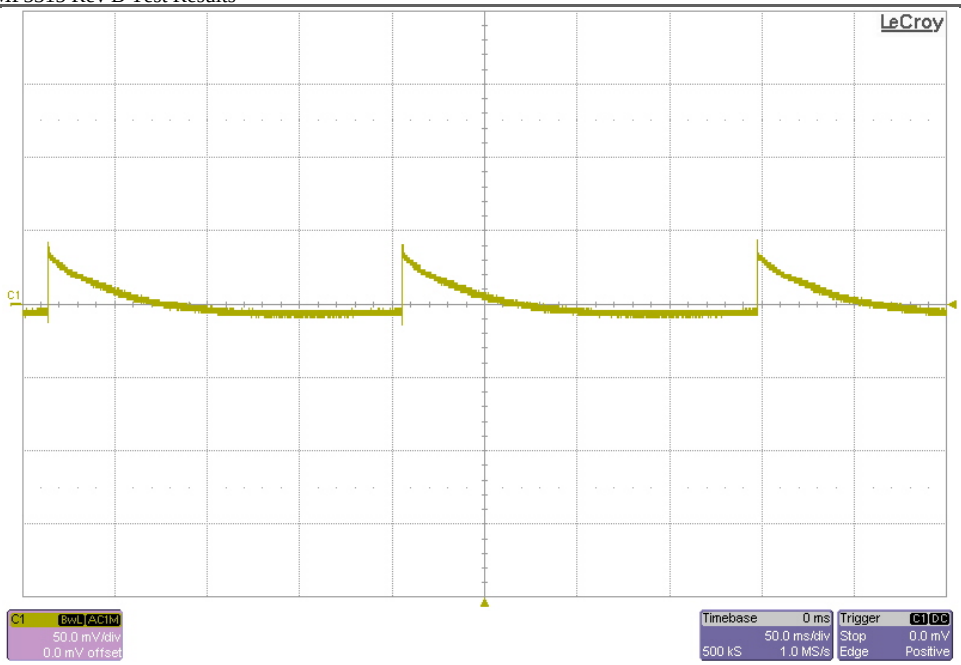




8 Output Ripple Voltage – No Load

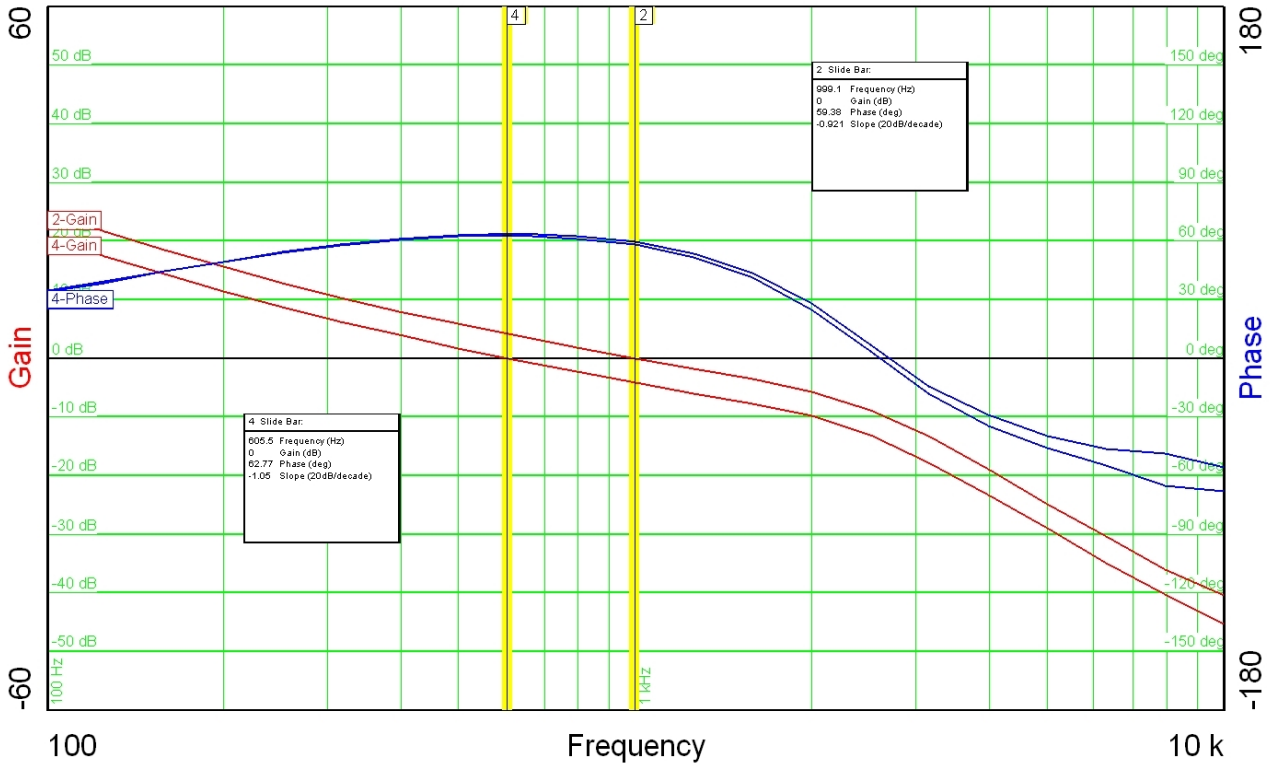
The output ripple voltage during no load operation is shown in the plots below. The top image shows the ripple with a 150VDC input. The bottom image shows the ripple with a 300VDC.





9 Frequency Response

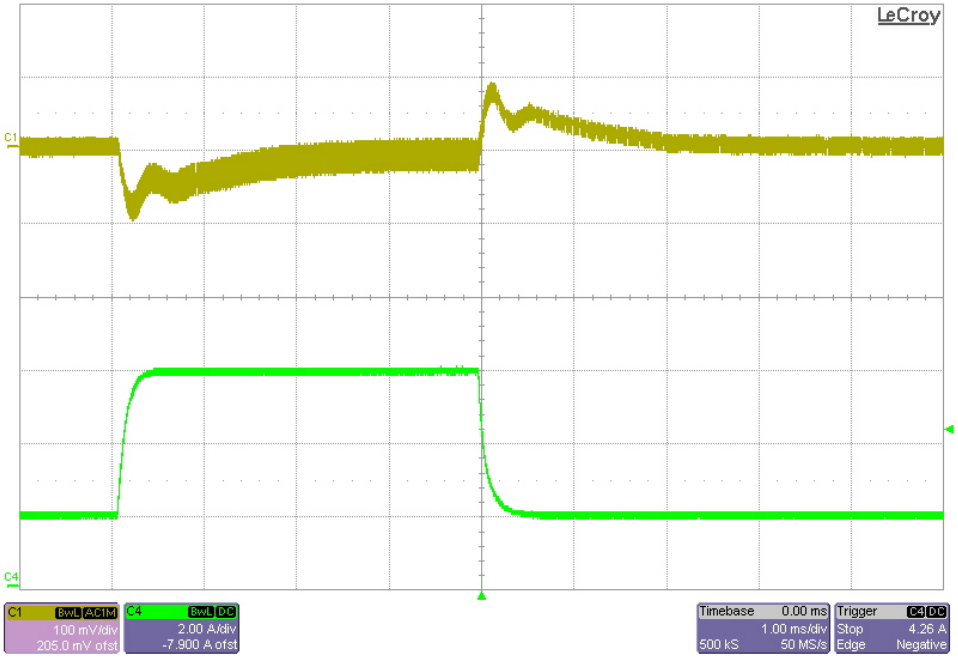
The frequency response of the converter feedback loop is shown in the image below. The output was loaded with 6.5A. For the upper gain/phase plot the input was 350VDC. For the lower gain/phase plot, the input was 150VDC.

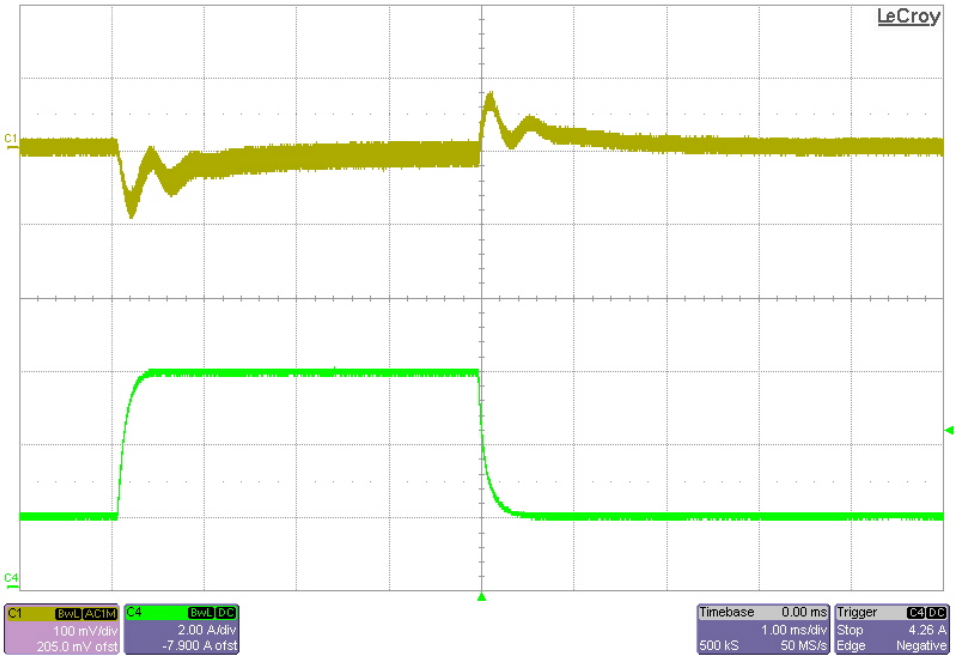


10 Load Transients

The images below show the response to a 2A to 6A load transient. For the top image, the input voltage was set to 150VDC. For the bottom image, the input was set to 300VDC.

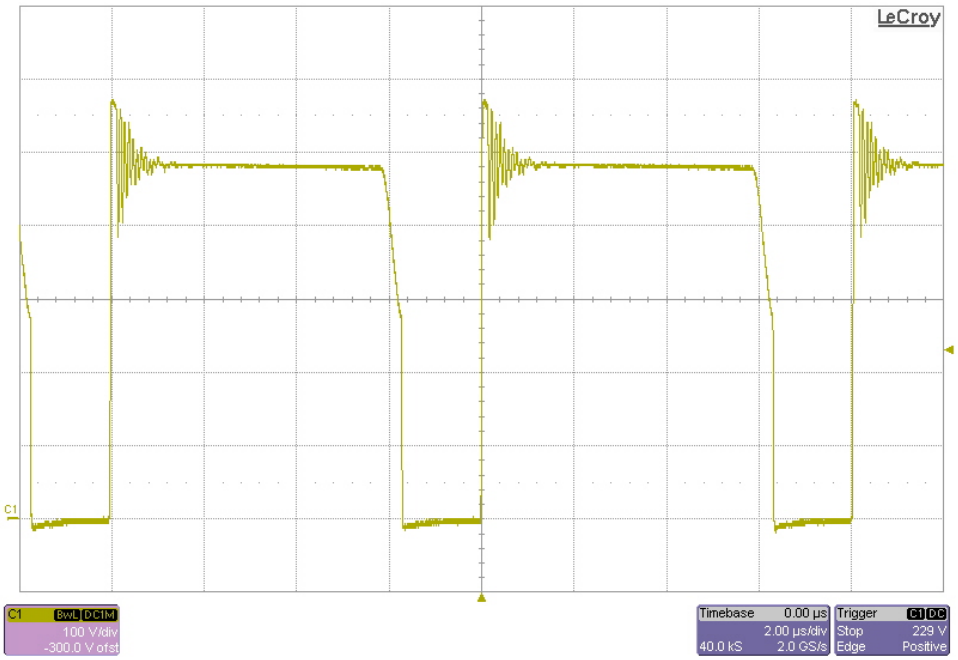
Channel 1: Vout (ac coupled) 100mV/div Channel 4: Iout 2A/div





11 Switching Waveforms

The image below shows the drain-to-source voltage waveform on the primary MOSFET (Q1). The load was 6.5A and the input was set to 370VDC.



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